TAXONOMIC NOTES ON DUTCH DESMIDS II

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ABSTRACT - Two desmid taxa are newly described: *Heimansia* gen. nov., and *Xanthidium antilopaeum* (Bréb.) Kütz. var. *heimansii* var. nov. Of seven taxa the names are recombined: *Xanthidium basidentatum* (Børges.) stat. nov., *X. octocorne* (Ehrenb.) ex Ralfs var. *depressum* (Grönbl.) comb. nov., *Staurodesmus dejectus* (Bréb. ex Ralfs) Teil. var. *brevispinus* (Nygaard) comb. nov., *S. dejectus* var. *robustus* (Messik.) comb. nov., *S. extensus* (Borge) Teil. var. *isthmosus* (Heimerl) comb. nov., *S. orientalis* (Scott & Presc.) comb. nov., and *S. subhexagonus* (W. & G.S. West) comb. nov. The names *Staurodesmus bulnheimii* (Racib.) Round & Brook, *S. connatus* (Lund.) Thom., *S. corniculatus* (Lund.) Teil., and *S. extensus* var. *joshuae* (Gutw.) Teil. are validated. *Staurodesmus aristiferus* (Ralfs) Teil. and *S. convergens* (Ehrenb. ex Ralfs) Lillieroth ▬ provided with correct nomenclatural authorities.

RÉSUMÉ - Deux nouveaux taxons appartenant à l'ordre des Desmidiales sont décrits: *Heimansia* gen. nov., et *Xanthidium antilopaeum* (Bréb.) Kütz. var. *heimansii* var. nov. Pour sept taxons, de nouvelles combinaisons sont proposées: *Xanthidium basidentatum* (Børges.) stat. nov., *X. octocorne* (Ehrenb.) ex Ralfs var. *depressum* (Grönbl.) comb. nov., *Staurodesmus dejectus* (Bréb. ex Ralfs) Teil. var. *brevispinus* (Nygaard) comb. nov., *S. dejectus* var. *robustus* (Messik.) comb. nov., *S. extensus* (Borge) Teil. var. *isthmosus* (Heimerl) comb. nov., *S. orientalis* (Scott & Presc.) comb. nov., et *S. subhexagonus* (W. & G.S. West) comb. nov. Les noms *Staurodesmus bulnheimii* (Racib.) Round & Brook, *S. connatus* (Lund.) Thom., *S. corniculatus* (Lund.) Teil. et *S. extensus* var. *joshuae* (Gutw.) Teil. sont validés. *Staurodesmus aristiferus* (Ralfs) Teil. et *S. convergens* (Ehrenb. ex Ralfs) Lillieroth sont affectés des noms d'auteurs corrects.

KEY WORDS : taxonomy, desmids, *Heimansia, Xanthidium, Staurodesmus,* The Netherlands.

In anticipation of the appearance of the fifth part of a Dutch desmid flora, dealing with *Xanthidium, Staurodesmus* and the colonial genera, some taxonomic and nomenclatural aspects will be worked out.

Heimansia genus ▬

When Brébisson (1856) published the genus *Cosmocladium* including the species *C. pulchellum,* it was characterized in essence by *Cosmarium*-like cells united to branched colonies by interconnecting strands, being attached near the cellular sinus. In an excellent study on the genus *Cosmocladium,* Heimans (1935) rendered it plausible the names *C. pulchellum* Bréb., *C. saxonicum* De Bary and *C. quimbyi* Wood to be synonymous. In his opinion, the earlier name *C. pulchellum* has to be rejected as a *nomen confusum,* in favour of the later name *C. saxonicum.* Ever since, *C. saxonicum* is considered the type species of the genus (Gerrath, 1970).

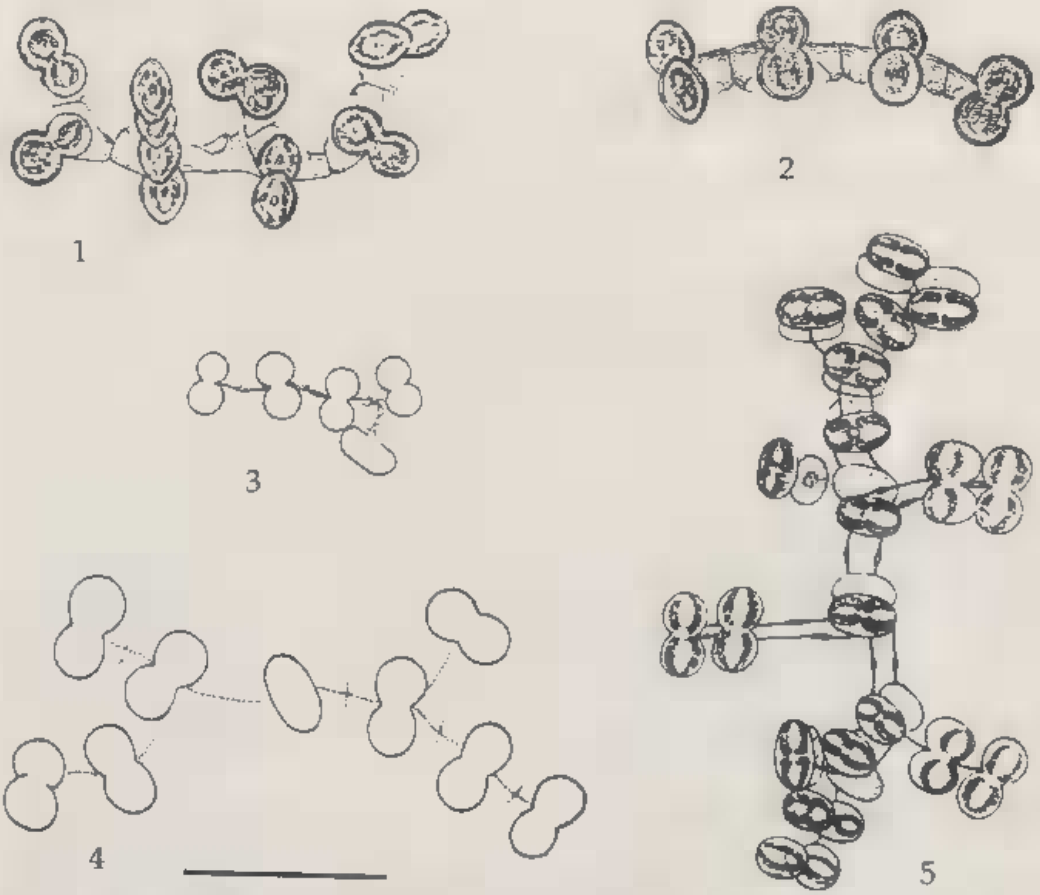

Plate 1 - Figs 1-3: *Heimansia pusilla* (Hilse) comb. nov. (after Heimans, 1935, t. 5: 65, 60, and 47 respectively - as *Cosmocladium pusillum* Hilse). Fig. 4: *Heimansia pusilla* (original drawing after Dutch material; bar = 25 µm). Fig. 5: *Cosmocladium saxonicum* De Bary (after De Bary, 1865, t. 4: 1).

In that same, above-mentioned publication Heimans made clear that in *C. pusillum* Hilse the intercellular connecting strands have to be considered remnants of the initial cell walls cast off from young semicells following cell division (see our Pl. 1, figs 1, 2). The discarded initial walls may soon deform and give the impression of one or two parallel threads with some kind of a tuft half-way (Pl. I, fig. 3). However, Heimans unjustly took for granted that the nature of the connecting strands as observed in *C. pusillum* would hold for the whole genus *Cosmocladium*. Consequently, earlier observations by Schröder (1900) and Lütkemüller (1902, 1910) that the connecting strands in *C. saxonicum, C. constrictum* (Arch.) Arch. and *C. perissum* Roy & Biss. originate from special pores at the semicell base were denied (Heimans, *loc. cit.*, p. 121).

Yet, Gerrath (1970, figs 1, 8) by means of electron micrographs demonstrated in *C. saxonicum* that the connecting strands, consisting of microfibrillar subunits, arise from special pores near the isthmus. Where contacting each other, strands show some overlap resulting in a local thickening. As *C. saxonicum* is considered the type species of the genus *Cosmocladium*, Gerrath *(loc. cit.)* concluded that *C. pusillum*, and any

other species in which the cells ▬ interconnected by initial wall material should be excluded from the genus *Cosmocladium* and transferred to the genus *Cosmarium*. So far, this suggestion was not followed. Prescott *et al.*,, in their *Synopsis of North American Desmids* (1981), make ample room for Gerrath's conclusions but, for practical reasons, still incorporate *C. pusillum* in the genus *Cosmocladium*.

I agree with Gerrath (loc. cit.) that *C. pusillum* and related genera should be excluded from the genus *Cosmocladium* but does not think it ▪ good idea to transfer these taxa to *Cosmarium*. To my mind, the specific way of colony formation by means of interconnecting discarded initial cell walls as shown by *C. pusillum* is likewise characteristic as the system of interconnecting gelatinous strands exhibited by *C. saxonicum*. Attention has to be paid to the fact that, within the genus *Cosmocladium sensu stricto*, the capability of colony formation by gelatinous strands is widely varying. Whereas in *C. saxonicum* relatively thick strands are secreted from conspicuous isthmus pore groups and large, branched colonies may be formed, in *C. perissum* Roy & Biss. the strands - originating from some simple isthmus pores - are extremely delicate, as a consequence of which colony size but seldom exceeds the number of 3-4 cells (West *et al.*, 1923, p. 22). Actually, coherence of the colonies by means of discarded cell walls as in *C. pusillum* often appears to be more durable than that in 'real' *Cosmocladium* species, especially in fixed material.

In view of the above-mentioned, the distinction of a separate genus, named for the author who described its mechanism of intercellular connection in great detail, seems to be justified:

***Heimansia* gen. nov.**

Cellulae Cosmarioidae leves parietes habentes, apud isthmum in colonias inter se coniunctae sunt per deiectos parietes cellularum originales.

Species typica: Heimansia pusilla (Hilse) comb. nov. (Basionymum: Cosmocladium pusillum Hilse, 1866, p. 117).

***Heimansia* gen. nov.**

Smooth-walled, *Cosmarium*- like cells, interconnected at the isthmus into colonies by means of discarded initial cell walls. For emended diagnosis of *Cosmocladium* see Gerrath (1970).

Photomicroscopically, the genus *Heimansia* may be distinguished from *Cosmocladium* by the morphology of the interconnecting strands. Whereas *Cosmocladium* strands at best show a simple thickening about half-way (as a result of some overlap), in the midst of *Heimansia* strands short transverse threads may be observed, being remnants of former cell walls (compare Pl. 1, figs 4 and 5).

Obviously, next to *C. pusillum* also *C. tumidum* Johns. has to be transferred to the genus *Heimansia* (cf. Scott & Grönblad, 1957, t. 8: 19-20; Bourrelly, 1966, t. 98: 2): *Heimansia tumida* (Johns.) comb. nov. (Basionym: *Cosmocladium tumidum* Johnson, 1895, p. 296, t. 240: 23). *Heimansia tumida* (Johns.) comb. nov. var. *evolutum* (Scott & Grönbl.) comb. nov. (Basionym: *Cosmocladium tumidum* Johns. var. *evolutum* Scott & Grönblad, 1957, p. 48, t. 8: 19-20.

In the Netherlands, *Heimansia pusilla* has been recorded only incidentally, both from acid and alkaline, mesotrophic habitats. *Heimansia tumida* is not known from our country.

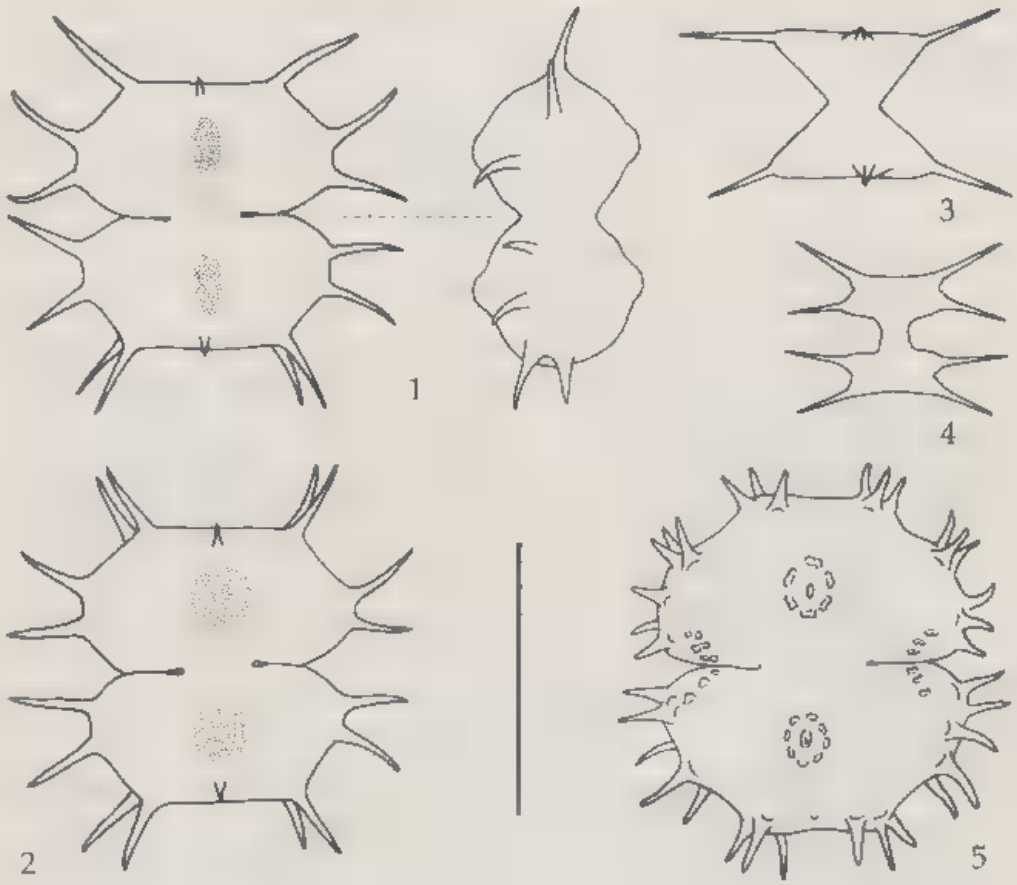

Plate 2 - Figs 1, 2: *Xanthidium antilopaeum* var. *heimansii* var. nov. Fig. 3: *Staurodesmus orientalis* (Scott et Presc.) comb. nov. (after Beijerinck, 1926, t. 8: 178, as *Staurastrum curvatum* West). Fig. 4: *Xanthidium octocorne* var. *depressum* (Grönbl.) comb. nov. Fig. 5: *Xanthidium basidentatum* (Børges.) stat. nov. (Figs 1, 2 and 5 are from Heimans's archive). Bar = 50 µm.

Xanthium antilopaeum (Bréb.) Kütz. var. _heimansii_ var. nov. (Pl. 2, figs 1, 2)

Differt ■ varietate eponymica per in media parte eminentem tumorem, plerumque fuscum, et per parvam spinam inter tumorem et apicem. Spinae marginales non omnes binae sed partim singulariter dispositae sunt. Longitudo sine spinis 48-53 µm, cum spinis 64-79 µm. Latitudo sine spinis 44-53 µm, cum spinis 71-77 µm. Crassitudo 28-32 µm.

Holotypus: Tab. 2, fig. 1.

Var. *heimansii* differs from the nominal variety by the presence of a pronounced, usually brown-coloured central tumor and a small spine between central tumor and apex. Whereas var. *antilopaeum* is characterized by ■ pair of spines at each of the lateral and apical angles of the semicell, in var. *heimansii* the apical spines not seldom are reduced in number to one per angle and - when facing the cell from aside - the lateral spines usually are disposed in ■ median, longitudinal plane rather than in

transversal ones. In the presence of a distinct central tumor and also in the irregular positioning of the marginal spines var. *heimansii* somewhat resembles *X. antilopaeum* var. *hebridarum* W. & G.S. West, but the additional median, subapical spine is most characteristic.

The above described algal form was figured (but not published) by Prof. J. Heimans from a sample collected near the Dutch village of Noordlaren, in 1916. So far, it is the only record from our country.

***Xanthidium basidentatum* (Børges) stat. nov. (Pl. 2, fig. 5)**

Basionym: *Xanthidium brebissonii* var. *basidentatum* Børgesen, 1889, p. 148, t. 6: 11.

This algal form, originally described by B&bar3.orgesen *(loc. cit.)* as a variety of *X. brebissonii* Ralfs was transferred as var. *basidentatum* to *X. aculeatum* Ehrenb. by West & West (1912, p. 80), whereas Ruzicka (1955, p. 263) recombined it to *X. fasciculatum* Ehrenb. var. *basidentatum*. Ruzicka *(loc. cit.)* amply states his reason for this last mentioned transfer but to my mind, following his argumentation, the alga in question could be classed as a variety under *X. cristatum* Bréb. as well. Since it concerns a well identifiable taxon its raising in rank to species level seems less arbitrary.

In the Netherlands, *X. basidentatum* is a very rare taxon, only known from mesotrophic pools near Barneveld (1919) and Barchem (1925).

***Xanthidium octocorne* (Ehrenb.) Ralfs var. *depressum* (Grönbl.) comb. nov. (Pl. 2, fig. 4)**

Basionym: *Arthrodesmus octocornis* Ehrenb. var. *depressum* Grönblad, 1960, p. 45, t. 7: 148.

Following Teiling's (1948) conception of *Staurodesmus*, consequently all not-monospinous representatives of the genus *Arthrodesmus* Ehrenb. ex Ralfs better can be placed under *Xanthidium* Ehrenb. ex Ralfs (see e.g. Förster, 1972, p. 565), at least as long as the proposal of Bicudo (1984) for conservation of the generic name *Arthrodesmus* Arch. for representatives of its section Octacanthium Hansg. has not been realized.

So far, *Arthrodesmus octocornis* var. *depressum* - differing from the nominal variety by its lower cellular length: breadth ratio - was not recombined.

In the Netherlands, this taxon was found only once: in a pool near Voorst (1916).

***Staurodesmus dejectus* (Bréb. ex Ralfs) Teil. var. *brevispinus* (Nygaard) comb. nov. (Pl. 3, figs 4-6)**

Basionym: *Staurastrum curvatum* W. West forma *brevispina* Nygaard, 1949, p. 89, fig. 43.

Teiling (1967, p. 535, T. 9: 12) considers Nygaard's taxon to belong to *Staurodesmus cuspidatus* (Bréb. ex Ralfs) Teil. var. *curvatus* (W. West) Teil., but, in view of the characteristically cup-shaped semicells, its relationship to *Std. dejectus* is much more obvious (compare our Pl. 3, figs 1-3 and figs 4-6).

In the Netherlands, *Std. dejectus* var. *brevispinus* is a rare taxon, known from oligotrophic, acid moorland pools.

***Staurodesmus dejectus* (Bréb. ex Ralfs) Teil. var. *robustus* (Messik.) comb. nov. (Pl. 3, figs 7, 8)**

Basionym: *Staurastrum cuspidatum* Bréb. ex Ralfs var. *robustum* Messikommer, 1928, p. 208, t. 8: 11.

The algal form depicted in Pl. 3, figs 7-8 was named *Std. dejectus* var. *borealis* Croad. in one of our earlier publications (Coesel, 1979, p. 394, t. 22: 6-7). However, it appears also to be identical with Messikommer's var. *robustum*, which latter name - at variety level - has priority.

In the Netherlands, *Std. dejectus* var. *robustus* is locally not rare in mesotrophic peat pits and fen hollows in the broads area of N.W.-Overijssel.

***Staurodesmus extensus* (Borge) Teil. var. *isthmosus* (Heimerl) comb. nov. (Pl. 3, figs 11-13)**

Basionym: *Arthrodesmus incus* (Bréb.) Hass. ex Ralfs forma *isthmosa* Heimerl, 1891, p. 603, t. 5: 18.

Synonym: *Staurodesmus isthmosus* (Heimerl) Croasdale, 1957, p. 130.

The raising in rank of forma *isthmosa* Heimerl to species level by Croasdale (1957) was adopted by Teiling (1967, p. 513) although the latter signalized a high degree of similarity between *Std. isthmosus* and *Std. extensus* (compare also our Pl. 3, figs 10 and 11-13). Actually, the main differentiating character, i.e. the transition between the apical angles of the semicell body and superimposed spines (which is rather abrupt in *Std. extensus*, versus gradually in *Std. isthmosus*) is but little consistent, so that the taxon *isthmosus* better can be classed under *Std. extensus*.

In the Netherlands, *Std. extensus* var. *isthmosus* is fairly common in oligotrophic, acid moorland pools.

***Staurodesmus orientalis* (Scott & Presc.) comb. nov. (Pl. 2, fig. 3)**

Basionym: *Staurastrum megacanthum* Lund. var. *orientale* Scott & Prescott, 1961, p. 98, t. 55: 5-8.

Synonym: *Staurodesmus megacanthus* (Lund.) Thunm. var. *orientalis* (Scott & Presc.) Teiling, 1967, p. 554.

Under the synonymous names *Staurastrum megacanthum* and *Staurodesmus megacanthus* a fair number of infraspecific taxa have been described, the mutual morphological resemblance of which not seldom is rather poor (see also comments in Teiling, 1967, p. 554). To my mind, the algal form depicted in our Pl. 2, fig. 3 - highly resembling *Std. megacanthus* var. *orientalis* as originally figured by Scott & Prescott *(loc .cit.)* - on the basis of its semicell shape may be associated with other *Staurodesmus* species (e.g. *Std. triangularis* (Lagerh.) Teil.) as well. Since this variety cannot be classed in a satisfying way, it better may be raised in rank to a separate species.

In the Netherlands, *Std. orientalis* is only known from the oligotrophic lake Esmeer, near Veenhuizen (1924).

***Staurodesmus subhexagonus* (W. et G.S. West) comb. nov. (Pl. 3, fig. 9)**

Basionym: *Arthrodesmus incus* (Bréb.) Hass. ex Ralfs. var. *ralfsii* W. et G.S. West forma *subhexagona* W. & G.S. West, 1912, p. 96, t. 114: 6.

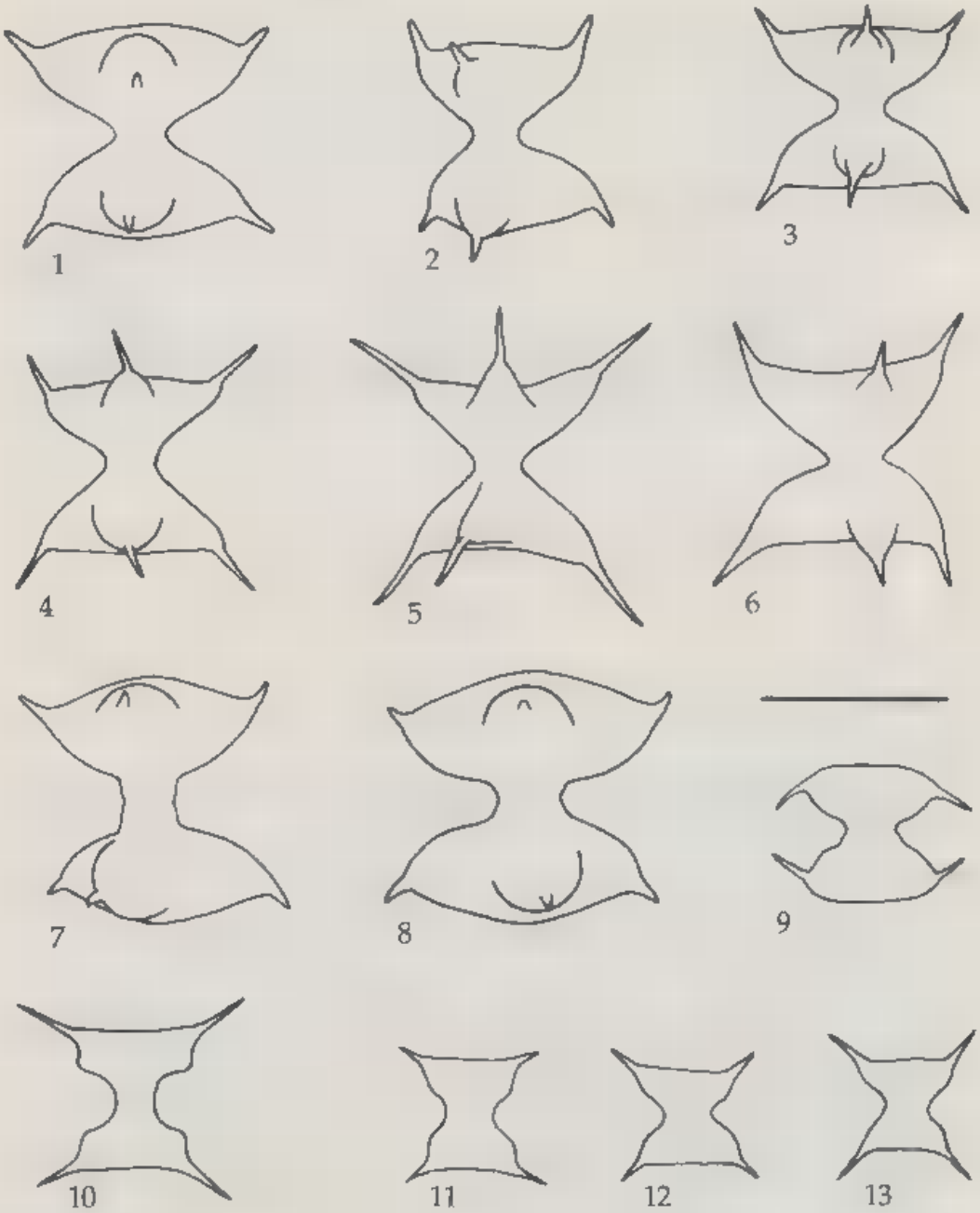

Plate 3 - Figs 1-3: *Staurodesmus dejectus* (Bréb. ex Ralfs) Teil. var. *dejectus*. Fig. 4-6: *S. dejectus* var. *brevispinus* (Nygaard) comb. nov. Figs. 7, 8: *S. dejectus* var. *robustus* (Messik.) comb. nov. Fig. 9: *Staurodesmus subhexagonus* (W. & G.S. West) comb. nov. Fig. 10: *Staurodesmus extensus* (Borge) Teil var. *extensus*. Figs 11-13: *S. extensus* var. *isthmosus* (Heimerl) comb. nov. (Figs 4, 5, 6 and 9 are from Heimans's archive). Bar = 25 µm.

Synonym: *Staurodesmus triangularis* (Lagerh.) Teil. var. *subhexagonus* (W. & G.S. West) Teiling, 1967, p. 518.

Owing to distinct differences in cell shape between *Arthrodesmus incus* var. *ralfsii* and its forma *subhexagona*, Teiling (1967) justly recombined the latter forma. On the basis of the 'elevated' apical part of the semicell body Teiling *(loc. cit.)* transferred the algal form in question to *Staurodesmus triangularis*, but in my opinion the taxon *subhexagona* has little to do with *S. triangularis* (which is characterized by triangular, instead of hexagonal semicells) and deserves the status of a separate species.

In the Netherlands, *Std. hexagonus* is a rare taxon, only known for certain from the oligotrophic moorland pool Van Essenven, near Oisterwijk (1925).

Next to the above-discussed taxa a number of *Staurodesmus* species, making part of the Dutch desmid flora, have to be briefly dealt with since their names formally were invalidly published. According to Article 33.2 of I.C.B.N., from 1 Jan. 1953 recombined names need a clear indication of their basionym, with a full reference to their author and original publication. As far as could be ascertained, this was not done in the following taxa. By supplying this deficiency, the names in question are validated.

***Staurodesmus bulnheimii* (Racib.) Round et Brook, 1959, p. 184.**

Basionym: *Arthrodesmus bulnheimii* Raciborski, 1889, p. 95, t. 6: 17.

In the Netherlands, this taxon is of rare occurrence in oligotrophic, acid, moorland pools.

***Staurodesmus connatus* (Lund.) Thomasson, 1960, p. 34.**

Basionym: *Staurastrum dejectum* Bréb. ex Ralfs var. *connatum* Lundell, 1871, p. 60, t. 3: 28.

Just like *Std. bulnheimii*, *Std. connatus* is of rare occurrence in oligotrophic moorland pools in the eastern part of our country.

***Staurodesmus corniculatus* (Lund.) Teiling, 1967, p. 548.**

Basionym: *Staurastrum corniculatum* Lundell, 1871, p. 57, t. 3: 23.

In his 1967 publication (p. 548), Teiling suggests the taxon *corniculatus* Lund. already to be transferred in Teiling (1948, p. 76). However, according to Art. 33.1 of I.C.B.N. that publication was not valid since the epithet *corniculatum* was not used in particular combination with *Staurodesmus*.

In the Netherlands, *Std. corniculatus* was encountered only once: in a moorland pool near Winterswijk (1910).

***Staurodesmus extensus* (Borge) Teil. var. *joshuae* (Gutw.) Teiling, 1967, p. 515.**

Basionym: *Arthrodesmus incus* (Bréb.) Hass. ex Ralfs forma *joshuae* Gutwinski, 1891, p. 64, t. 3: 6.

In the Netherlands: *Std. extensus* var. *joshuae* is only known from acid, oligotrophic moorland pools near Boxtel (1909), Ommen (1918) and Hilversum (1919).

Finally, the author names belonging to two *Staurodesmus* species have to be changed as compared to what is stated in Teiling (1967):

***Staurodesmus aristiferus* (Ralfs) Teiling, 1950, p. 311.**

This in stead of *Staurodesmus aristiferus* (Ralfs) Thomasson, 1960, p. 34 (as stated in Teiling, 1967, p. 560). Although Teiling in his 1950 publication mentioned the name of *Staurodesmus aristiferus* only incidentally and without nomenclatural authority, from the context in question it is quite obvious that in doing so he had the taxon *Staurastrum aristiferum* Ralfs in view, so that it may be considered a valid recombination, prior to the one by Thomasson *(loc. cit.)*.

In the Netherlands, *Std. aristiferus* is only known from acid, oligotrophic moorland pools near Winterswijk (1910) and Oiterwijk (1925).

***Staurodesmus convergens* (Ehrenb. ═ Ralfs) Lillieroth, 1950, p. 264.**

This in stead of *Staurodesmus convergens* (Ehrenb.) Teiling, 1948, p. 57. (as stated in Teiling, 1967, p. 587). The reference to Teiling (1948, p. 57) is not correct because of incompatibility of the 1948 publication to Art. 33.1 of I.C.B.N.

In our country, *Std. convergens* is of fairly common occurrence in oligomesotrophic habitats.

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